Nuclear Division News

UNION CARBIDE

A Newspaper for Employees of the Nuclear Division, Union Carbide Corporation

Vol. 8/No. 16 August 18, 1977

The corporate world of Union Carbide

Despite record sales in the second quarter and second half of 1977, Union Carbide Corporation recorded net income 13 percent below that of the second quarter last year. The company earned $102.6 million, or $1.62 a share.

All domestic lines of business reported year-to-year increases in first-half sales. Chemicals and Plastics recorded above average gains. Gases and Related Products and Consumer and Related Products scored substantial increases as well. Domestic sales totaled $2.37 billion in the first half of 1977, up 15 percent over the same period last year. Unit volume rose 12 percent, while selling prices rose three percent.

International sales for the first six months of 1977 were $1.09 billion, up eight percent over the first half of last year.

Spokesmen for the corporation said escalating manufacturing costs prevented the strong sales performance from flowing through to earnings.

The board of directors of Union Carbide has declared the corporation's 241st consecutive dividend. The amount is 70¢ a share on the outstanding capital stock, payable September 1, to stockholders of record on August 5.

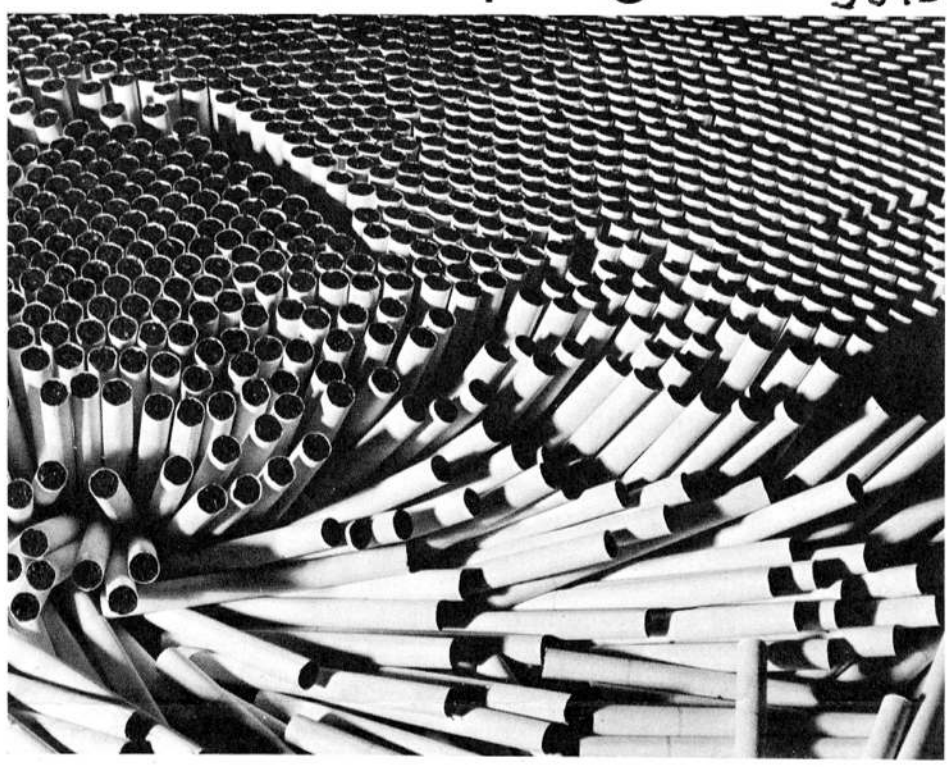
This was the same amount of the dividend paid June 1.

Reducing health hazards of smoking goal of tobacco research program

3592-72

In the late 1950's, public concern over the high content of tar and nicotine caused American manufacturers to change the makeup of cigarettes. Development of filters and new types of tobaccos and papers resulted in the tar and nicotine yield from the average cigarette being reduced by more than 50 percent. Consequently, a given brand today produces about one-half as much smoke as the same brand did in the 1950's, and the change has gone generally undetected by smokers.

Recently there has been a new rash of publicity concerning the health hazards associated with tobacco smoke. A two-part article in *Readers' Digest* last fall presented evidence that it is not only the nicotine and tar in cigarette smoke that cause health problems, but poisonous gases such as carbon monoxide, hydrogen cyanide and nitrogen oxides.



Not pipes . . . cigarettes

Program began in 1968

The presence of harmful gases in tobacco smoke has long been recognized, and studies to identify and analyze them to determine their effects on cigarette smokers have been underway in the ORNL tobacco smoke research program since 1968.

Administered jointly by the Analytical Chemistry and Biology Divisions, the program performs chemical analysis of cigarette smoke, develops instrumentation, and conducts biological studies to determine the effects of smoke on laboratory animals.

The program consists of four major activities: smoke chemistry and bioassay research projects, sponsored by the National Cancer Institute's (NCI) Smoking and Health Program; and exposure instrumentation and dosimetry projects which are sponsored by the Council for Tobacco Research, a non-profit research institute supported by the tobacco industry.

Michael Guerin, head of the bio/organic analysis section of the Analytical Chemistry Division, said studies conducted are aimed at answering the question, "can we go further in reducing the health hazards of cigarette smoke?"

Reduce health hazards

There are many different kinds of cigarette smoke. "Smoking is such an individualistic act that factors such as the size of the puff, where on the cigarette the puff is drawn, and the length of time smoke is held in the mouth all affect a cigarette's potency," Guerin said.

Cigarette smoke contains more than 3,000 chemicals. Researchers in the ORNL program analyze these chemicals to determine which ones should be reduced in order to produce a less hazardous cigarette.

To obtain accurate information about smoking, mice are exposed to cigarette smoke that has been manufactured by mechanical devices. By using these "smoking" machines, smoke can be produced with a high degree of control and reproducibility since it does not depend on the condition or habits of an individual animal.

Studies are conducted to measure the biological impact of smoking on the animals in order to estimate the relative hazard associated with smoking different kinds of cigarettes. These studies are led by Paul Nettesheim, head of the respiratory systems group in the Biology Division.

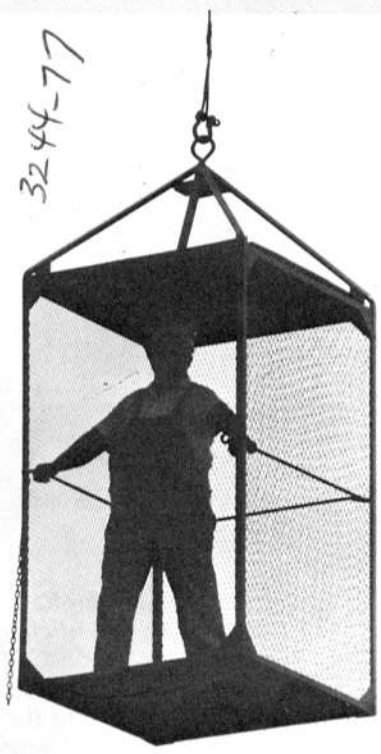
The quantity of smoke inhaled by the mice and where the smoke particles are deposited in their respiratory tract are determined through the dosimetry work which is directed by John Caton, Analytical Chemistry Division. Relationships discovered between smoke chemicals and cancer in the test animals can be related directly to human exposure.

Several types of smoking machines have been developed and/or perfected for use at ORNL and other laboratories through work in the exposure instrumentation project. This project, led by Jim Stokely, is currently designed to provide the Council for Tobacco Research with advanced devices to "smoke" mice and monitor smoke characteristics.

In addition to providing analytical and instrument design services to NCI

(Please see page 8)

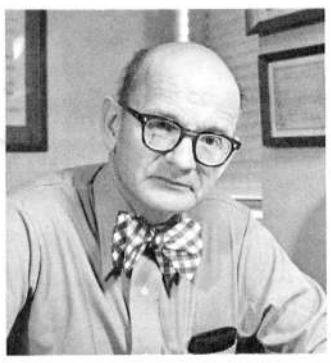
In this issue . . .



3244-77

A construction worker rides a cage to the top of ORNL's Holifield Heavy Ion Facility tower. Excellent construction weather allowed the contractor, Tipton & Reynolds, to catch up to their schedule which had been previously delayed by bad weather. The tower, now 140 feet high, is ready to receive the 440-ton pressure vessel. Other photos are on page 3.

Also in this issue:



Medicine Chest

by T. A. Lincoln, M.D.

(Editor's Note: Dr. Lincoln alternates his regular column with "The Medicine Chest," where he answers questions from employees concerning health in general. Questions are handled in strict confidence, as they are handled in our Question Box. Just address your question to "Medicine Chest," NUCLEAR DIVISION NEWS, Building 9704-2, Stop 20, Y-12, or call the news editor in your plant, and give him or her your question on the telephone.)

QUESTION: "During hot weather, should one take salt tablets?"

ANSWER: There are three types of salt tablets. One is just plain compressed salt, another is a salt impregnated binder and a third type is the enteric coated salt tablet. The last two are designed to delay the dissolution so the salt will be absorbed more slowly in the intestine. Each of these tablets usually contains 65 milligrams salt.

Salt tablets not needed.

Most experts do not feel that the use of salt tablets is necessary or desirable. They sometimes produce irritation of the stomach and can cause a mild gastritis or even nausea and vomiting. Infrequently the enteric coated tablets are passed per rectum still not dissolved. There are much easier ways to supplement salt intake.

Usually, physical exercise, either while working or "playing" outdoors, is necessary to produce major heat stress in this part of the country. Our hot humid weather can be extremely uncomfortable, but unless you are physically active, there is probably little need for extensive salt supplementation. Most people's dietary intake of sodium, the crucial part of salt (sodium chloride) is adequate.

The above recommendation may surprise some people in view of the often discussed problem of preventing heat exhaustion or cramps, but there is a scientific basis for it.

Several studies on heat adaptation in hot climates have shown that excess salt is undesirable. In one study, men were exposed to prolonged strenuous physical conditioning in a hot climate. They were kept on an adequate but constant intake of potassium. When the salt intake was high, there was an excessive loss of potassium. The latter caused a measurable impairment of cardiocirculatory performance.

Decreases metabolism

The Navy studied the effects of supplementary salt intake while performing vigorous training in a hot environment. The normal salt intake was assumed to be 15 grams a day. When the salt intake was increased either an additional 7.5 or 15 grams, there was a decreased work capacity, decline in metabolic efficiency, impaired heat acclimatization (the gradual body adjustment to heat which occurs after a couple of weeks of exposure) and progressive loss of total body potassium.

The obvious question then is, "How much is enough?" Ideally, the salt intake should balance the salt loss. A healthy adult has a fantastic capacity to sweat in hot dry environments. Men working in the desert can lose 10 to 12 liters of sweat per day and, if not replaced, could lose 20 to 25 pounds weight. In hot moist climates such as ours, sweat rates are greatly reduced and for the same temperature are only about half as much. Nevertheless, sweat losses of 5 to 10 pounds are not unusual when the exercise is vigorous, prolonged and the temperature is in the nineties.

The salt content of sweat varies in different individuals depending on acclimatization, salt intake, sweating rates, sex (women sweat less and their sweat is less salty) and urinary output. Sweat usually contains two to three grams of salt per liter.

The consumption of salt in the diet varies widely. Many people salt their food generously before even tasting it. Others never salt their food. The average intake is probably around 10 to 15 grams a day from all sources. Salt occurs naturally as sodium or as added salt in many foods and, of course, is used in cooking. Many commercial snack foods such as potato chips and cookies are heavily salted. A large dill pickle contains one gram of sodium, one frankfurter or one slice of bologna about 1/2 gram, and one glass of buttermilk or a two-inch square of cornbread contains about 1/4 gram of sodium.

In an effort to make a uniform recommendation, the National Institute for Occupational Safety and Health (NIOSH) settled on the provision of eight quarts of water containing 0.1 percent salt for each worker each shift who is exposed to occupational heat stress. Although precisely defined in the NIOSH proposed standard, heat stress means exposure to heat and humidity sufficient to cause a possible rise in body temperature. The various requirements in shielding, rest, acclimatization and intake of salted fluids should be sufficient to keep the body temperature below 100.4 degrees Fahrenheit (rectal temperature).

Summertime needs

Most recreational activities are of relatively short duration and do not involve vigorous physical exercise, so don't involve severe heat stress. Of course, a jogger who runs five miles at an eight minute per mile pace with the

(Please see page 8)

3558-77

Three promoted to supervisor in P&E

Kolski

Harmon

Keener

Lester L. "Slim" Harmon, R. Paul Keener and Frank J. Kolski, all of the Plant and Equipment (P&E) Division at ORNL, have been promoted to supervisory positions.

Harmon has been promoted to grounds supervisor and Keener to transportation supervisor in the Field, Transportation and Support Services Department, while Kolski now is a supervisor in the Building and Utility Services Department.

Harmon has been with the Nuclear Division 12 years. He hired in as a laborer and has been a supervisory trainee for the past several months. As grounds supervisor, Harmon oversees maintenance of all right-of-ways, security fences and roadways at ORNL and from Y-12 to ORGDP. Before joining the Nuclear Division, he was employed by H. K. Ferguson Company.

Harmon and his wife, Leila, live at Route 1, Heiskell. They have two children: Ronnie, who is employed in P&E as an electrician apprentice, and Brenda.

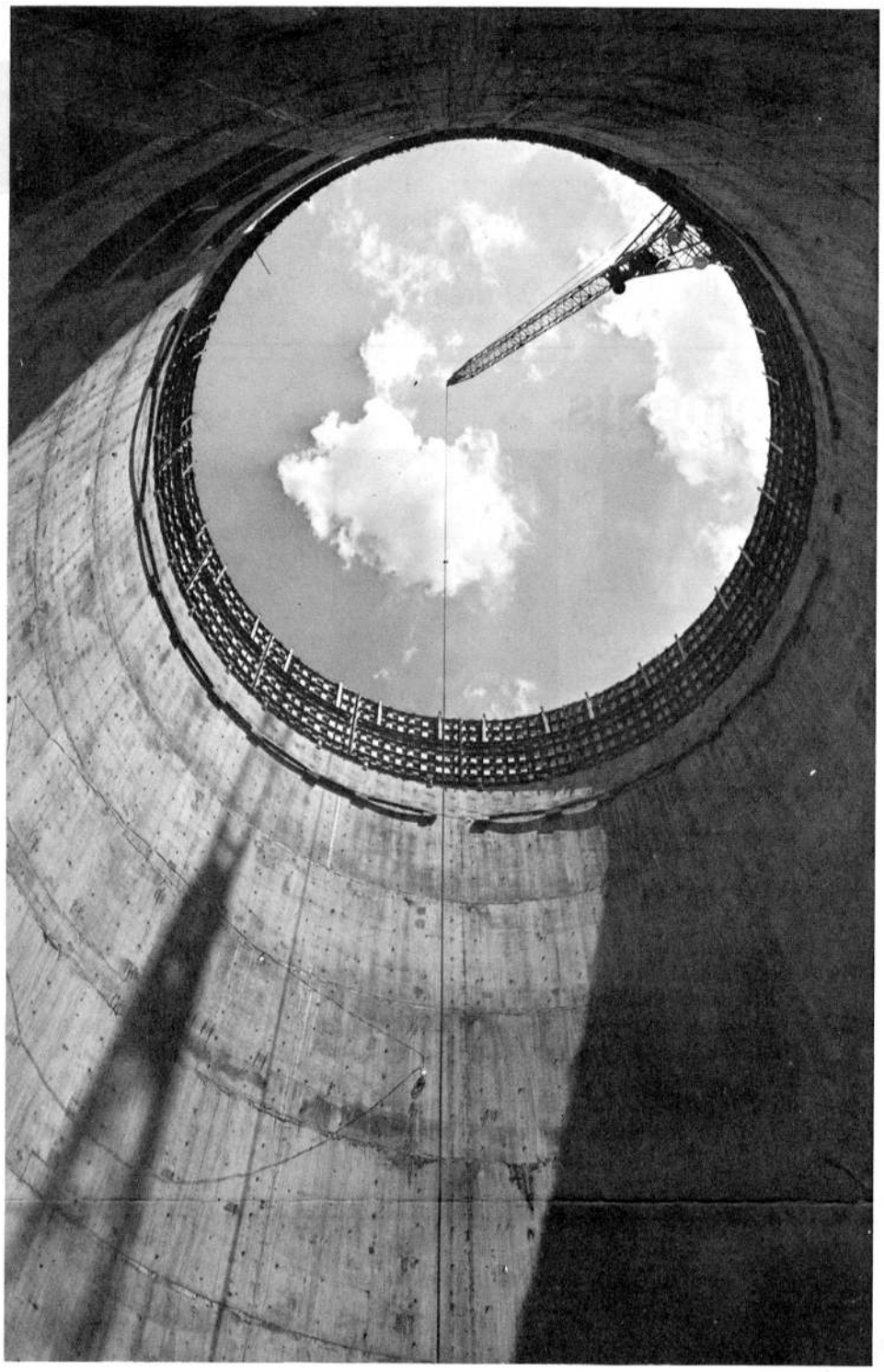
Keener began his tenure with the Nuclear Division in 1956, when he became a foreman's clerk, and later a foreman, in P&E. A native of Lenoir City, he was self-employed in the meat packing industry before joining the Nuclear Division. Keener and his wife, Helen, live at Route 3, Scenic Drive, Lenoir City. They have one son, Robert.

Kolski, who originally was from Ervington, N.J., was a masonry contractor before joining the Nuclear Division two years ago. Since hiring in, he has served both as a utility mechanic and planner-estimator for P&E. He received his B.A. in business management from Tennessee Technological University.

Kolski and his wife, Patricia, have two sons, Frank and Ed. They live at Route 2, Kingston.

PH 77-2920

ARTWORK FOR CENTER—Ruby Jones, Development Maintenance Department at ORGDP, left, donates a print of her work to the Michael Dunn Rehabilitation Center. Harriett Dunn, Benefit Plans at ORGDP, accepts the art. Dunn was president of the Roane County Association for Retarded Citizens, and is the daughter of Clarence R. Lay, a long time employee who retired from ORGDP in 1975 to devote full time to United Way activities and serve with the State Association for Retarded Citizens. Jones' print will hang in the new facilities for Michael Dunn now under construction.



POWER LIFT CONTINUES—At least 6 of 11 pressure vessel sections have been lifted and placed inside the tower of ORNL's Holifield Heavy Ion Facility (see photos above). Chicago Bridge and Iron, the vessel contractor, has been using a 350-ton crane to lift the 40-ton sections. The sections were assembled earlier this year on the front lawn of Building 6000.

Fabrication of the pressure vessel inside the tower should be completed by the end of this year. At that time, the tower will be capped off, bringing its total height to 165 feet.

July, 1979, is the scheduled date for completion of installation and testing of the 25 million volt tandem accelerator. The $18 million project will provide the nation with the most advanced tool for studying the reactions between accelerated beams of heavy, charged particles and matter.

division death. . .

Willard E. Johnson, Plant and Equipment (P&E) Division at ORNL, died at his Knoxville home on Tuesday, August 2.

Mr. Johnson was a welder in P&E for more than 24 years.

He worked at *The Knoxville News Sentinel* from 1934-38 and at Sanford Day Iron Works from 1938-52. He was also an Army veteran of World War II and a member of the Disabled American Veterans.

Survivors include: his wife, Juanita; three sons, Larry, Vernon and Chris; a daughter, Janene; and two grand children.

Burial was at Highland Memorial Cemetery, Knoxville.

Mr. Johnson

wanted

Y-12

RIDE or will join car pool from Kingston to West Portal, straight day. L. L. Wilcoxon, plant phone 3-7854, home phone Kingston 376-9664.

SCREWDRIVING COINS—A dime (or other coin if its size is more suitable) makes a safe screwdriver for something small that has to be held in the palm of the hand to be worked on. A conventional screwdriver might slip and gouge the hand.

about people . . .

3094.74 1918-77

Braunstein

Bamberger

Jerry Braunstein and **Carlos E. Bamberger,** group leader and research staff member, respectively, in the ORNL Chemistry Division, are directors of a three-day course on "Molten Salt Technology" to be offered October 10-12, by the Center for Professional Advancement, East Brunswick, N. J. The center is the nation's largest private non-degree educational institution offering continuing technical education programs. The three-day course, for engineers and scientists in basic and applied research and process development, is designed to familiarize participants with molten-salt properties and possibilities for industrial applications.

Braunstein co-edits "Advances in Molten Salt Chemistry" and is vice chairman of the 1977 Gordon Conference on Molten Salts. Bamberger has performed research in the areas of beryllium chemistry and physical chemistry of molten fluorides and their interaction with actinide compounds.

* * *

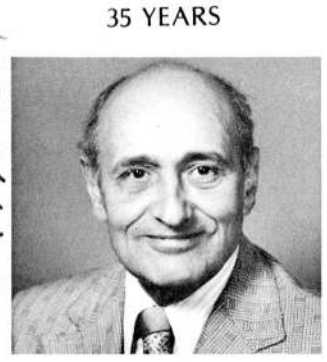
Walter N. Whinnery, Technical Services Division at PGDP, was recently presented the Louisville Engineering and Scientific Societies' Honor Award. The honor came in recognition of his outstanding postgraduate scholastic and leadership abilities. He ranked in the top five percent in the state of Kentucky among engineering students participating in the Engineer In Training certification program.

A native of Louisville, he holds B.S. and M.S. degrees from the University of Louisville. He joined Union Carbide earlier this year, after co-opping with J. E. Seagrams and B. F. Goodrich. He lives at Fairview Drive, Paducah.

anniversaries

ORGDP

35 YEARS



Murray Hanig joined the SAM Laboratories at Columbia University August 29, 1942, transferring to Oak Ridge in 1946. He has a B.S. degree in chemical engineering from Cooper Union and has done graduate work at New York University and the University of Tennessee.

A native of New York City, he and his wife, Evelyn, live at 835 West Outer Drive, Oak Ridge. They have two sons, Walter and Joseph; and two daughters, Martha and Laura.

Hanig is head of Systems Planning in the Operation Analysis and Planning Division.

30 YEARS

James H. O'Brien, Technical Development Department; Audra L. Southern, Technical Development Department; James M. Allen, General Accounting Division; Robert H. Severin, Engineering Division; Helen C. Hobson, Computer Sciences Division; and Roscoe Van Winkle, Engineering Division.

25 YEARS

Robert L. Greer, Billy P. Campbell, John L. Petty Jr., Gene Payne, Yonnie D. Tallant, Homer B. Smith, Carl L. Johnson, Kenneth O. Hackworth, Paul K. Sherrill, Bobby Beard, George V. De Bord, David W. Brown.

20 YEARS

Norma N. Gardner, Clifford E. Nunley, John S. Kennedy Jr., Owen E. Duncan, James A. Delker and Fred L. Beeler.

PADUCAH

25 YEARS

Bobby A. Abell, Joseph F. Conroy Jr., Woodrow W. Davis, Adrian K. Freels, Harold L. Howell and Rodney A. Miller.

20 YEARS

Marvin M. Ballard and Franklin E. Baggett.

Y-12 PLANT

30 YEARS

Gerald R. Guinn, Casting Department; James R. Wilmoth, Utilities Administration; James L. Overton, General Shops; William T. Luffman, A-Wing Shops; Anna George Dobbins, Development Division; and Rosa L. Lewis, Laboratory Operations.

25 YEARS

Carnelon V. Terry, Ruben A. Hubbard, Ambrose H. Ballard, Dana B. Arnold, Hoyt E. Moore, Roy H. Stooksbury, Tommy E. Verner, Kenneth E. Haeusler, John M. Napier and Acie L. Rainwater.

20 YEARS

James D. Shelton and Kenneth K. Aydelotte.

ORNL

30 YEARS

Ted C. Russell, Plant and Equipment; Hubert N. Wilson, Instrumentation and Controls; William A. Bird, Instrumentation and Controls; Leroy D. Vest, Computer Sciences; John H. Coobs, Metals and Ceramics; and Ernie P. Griggs, Metals and Ceramics.

25 YEARS

James D. Fultz, Alex H. Anderson Jr., Frank L. Layton, Norval F. Ziegler, Joseph G. Scarborough, Ernest L. Fair, Floyd H. Watson, Robert A. Francis Jr., Ellison G. Price, William F. Rogers, Williams H. Hicks and Kenneth O. Seiber.

20 YEARS

Harold R. Payne, Luther P. Pugh, James A. Steed Jr., and James E. Thompson.

wanted . . .

ORNL

RIDE from Spur Station at junction of Highways #61 and #95 straight day. Debbie Crama. Call Tim Bard, plant phone 3-9463, or home phone Clinton 457-4173.

WILL JOIN CAR POOL OR VAN POOL from Claxton Edgemoor Rd., area to East Portal, 8-4:30 shift, straight days. Betty Queen, plant phone 3-6265, home phone 945-2992.

CAR POOL MEMBER from areas of West Outer, Waddell, Pennsylvania or Hillside, Oak Ridge, to East Portal, 8:15 to 4:45. Tom Burnett, plant phone 3-6939, home phone 483-1975.

safety scoreboard

Time worked without a lost-time accident through August 11:

Paducah	20 Days	282,400 Man-Hours
ORGDP	105 Days	3,509,600 Man-Hours
Y-12 Plant	177 Days	5,479,000 Man-Hours
ORNL	108 Days	2,367,214 Man-Hours

retirements . . .

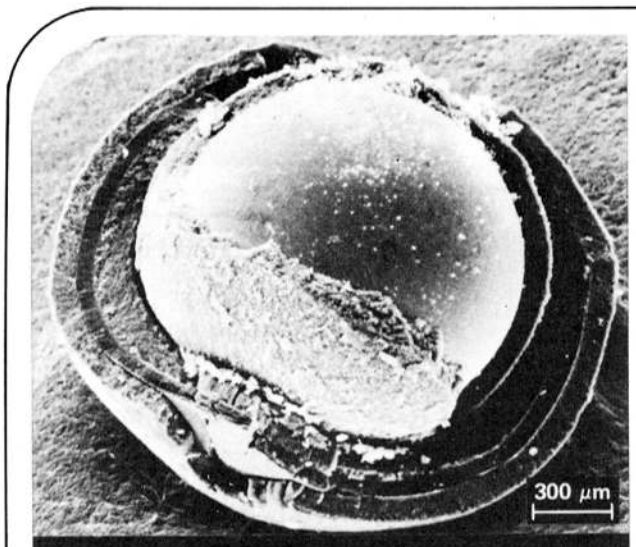
William L. Russell
Biology, ORNL
29 years service

Gerald W. Keilholtz
Energy, ORNL
29 years service

George F. Leichsenring
General Engineering
ORNL
33 years service

about people . .

Two ORNL staff members visited the White House recently to witness President Carter's signing of Strip Mine Bill, H.R. 2. **Edmund A. Nephew,** Energy Division, and **Liane B. Russell,** Biology Division, were invited to the ceremony because of their "special contributions" to the passage of the bill. While working with the Laboratory's environmental program, Nephew conducted analytical studies on the costs of reclamation and presented testimony before several House committees on strip mining. Russell, a co-founder of the Tennessee Citizens for Wilderness Planning, also presented testimony on the importance of restoring strip mined land to its original contours.

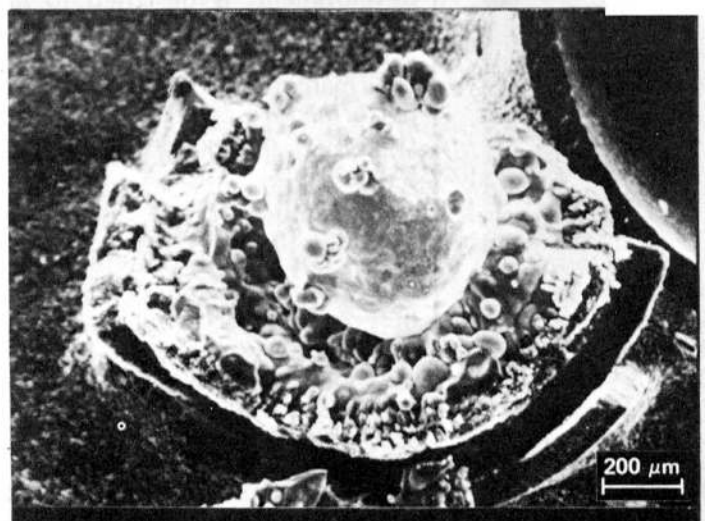


Unirradiated Particle showing Multicoating Design of Gas-Cooled Reactor Fuel

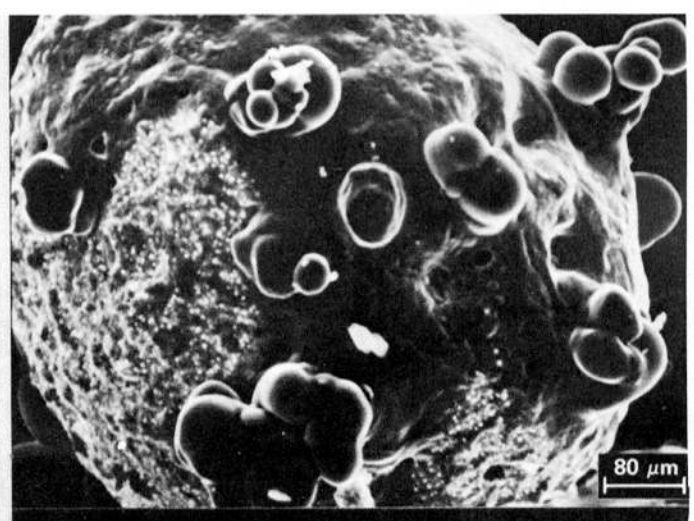
M&C exhibits win honors

Tommy J. Henson, Larry G. Shrader, Terry N. Tiegs, and George C. Wei all of ORNL's Metals and Ceramics (M&C) Division—returned to the Laboratory with first and second place awards for their exhibits at the 1977 Ceramographic Exhibit, held in connection with the American Ceramic Society's annual meeting in Chicago recently. **(See first place photos; surrounding.)**

Henson and Tiegs' entry on "Irradiation Performance of Gas-Cooled Reactor Particles Made From Weak-Acid-Resins" won the first place award in the Scanning Electron Micrograph (Natural Surface) category. Shrader and Tiegs teamed up to win the second place award in the optical micrograph (reflected) category with their exhibit on "Effect of Rare Earth Migration in an Irradiated UC2 Gas-Cooled Reactor Fuel Particle," and the Wei and Henson exhibit on "Vanadium Impurity in Residual Oil Combustion Products Attacks High-Duty Fireclay Refractories" won second place in the scanning electron micrographs (Natural Surfaces) category.



Irradiated Fuel Kernel Adhering to Coating Fragment



Irradiated Fuel Kernel showing Phase Segregation

question box

If you have questions on company policy, write the Editor, **Nuclear Division News** (or telephone your question in, either to the editor, or to your plant contact). Space limitations may require some editing, but pertinent subject matter will not be omitted. Your name will not be used, and you will be given a personal answer if you so desire.

Performance evaluations

QUESTION: Our performance evaluation determines, to a large extent, our annual merit raise. Our supervisor has stated that there is no way all personnel of any one section can be rated "superior" or above; that some must be rated at all levels in order that there be a rating system. This would make it almost impossible for some of us to reach the upper end of our salary bracket. If the maximum number of "superior" rated employees are already in a section, then to what goal do we lesser-rated employees strive for? If there are five employees in a section and all are performing their work in a superior manner, why can't they all be rated so?

ANSWER: If there are five employees in a section and all are really performing their work in a superior manner, they all may be rated superior . But as the size of the group increases, the chance of having a high percentage of superior ratings decreases.

The Union Carbide rating system requires an employee to be satisfactorily performing the *full job* to earn a competent rating. This is not a demeaning rating. It is one that describes performance meeting management's expectations.

The superior rating is reserved for employees performing *significantly* beyond the level necessary to fill *all* of the requirements of the job.

Since job ratings are, as you indicate, reflected in pay, review of all ratings by higher levels of supervision is necessary to promote consistent application of the system across the organization.

Extended time before raise?

QUESTION: For what reason would a nonexempt salaried employee not receive a raise in 18 months?

ANSWER: Although it is very unusual for a nonexempt employee to go 18 months or more between salary increases, there are some instances where, because of periods of extended absence or high absence frequency, increases have been delayed. The only other reason would be that performance of the employee is not equal to the present rate of pay.

We recommend that you contact your supervisor regarding this matter.

Intra-plant interviews

QUESTION: Does Company policy prohibit an employee who has gone to night school and perhaps received a degree from interviewing for a better position at another installation? My supervisor says that such an employee cannot interview at another installation. Is this correct and, if so, why?

ANSWER: It is the Company's policy to fill job openings, whenever possible, by promotion and/or transfer of employees within an installation or, when advisable, by transfer of employees between installations of the Nuclear Division.

In response to your specific question, Company policy does not prohibit an employee who has gone to night school and perhaps received a degree from interviewing for a better position at another installation. You should be certain that your newly acquired credentials are a matter of Company record, and that your interest in reassignment is known. This is best accomplished by alerting your supervisor and your plant Employment Office and letting the latter work with the other installation.

next issue...

The next issue will be dated September 1. The deadline is August 24.

Four promoted at Y-12 Plant

Four promotions were announced in the Y-12 Plant. David P. Elkins and Robert B. Richmond have been made engineers in the Engineering Division; Martha P. McKinstry has been promoted to supervisor of Engineering Records and Services in the Materials and Services Division; and Gary L. Ward has been named engineer in Metal Preparation Division.

Elkins, a native of Big Stone Gap, Va., joined Union Carbide after graduating last year from the University of Tennessee. He worked summers during school with Holliston Mills and Tennessee Eastman Company.

Married to the former Marcha Kim Williams, he lives at 9312 Bob Gray Road, Knoxville.

McKinstry has been with Union Carbide 28 years. She is a native of Cleveland, and has attended UT.

She and her husband, W. L. McKinstry of the Purchasing Division, live at 110 Chatham Lane, Oak Ridge. They have two children, Douglas and Linda.

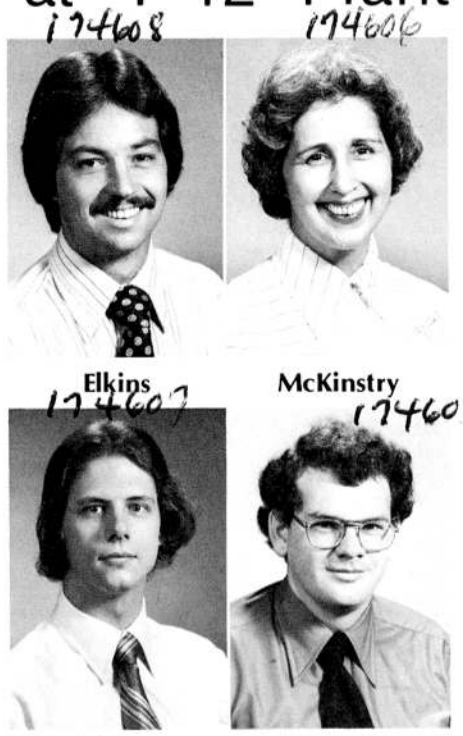
Richmond, a native of Youngstown, Ohio, graduated from Ohio State University, and joined Union Carbide this year.

He lives at 697 West Outer Drive, Oak Ridge.

Riggs, a native of Lake City, worked with H. K. Ferguson Company and Rust Engineering before joining Union Carbide seven years ago.

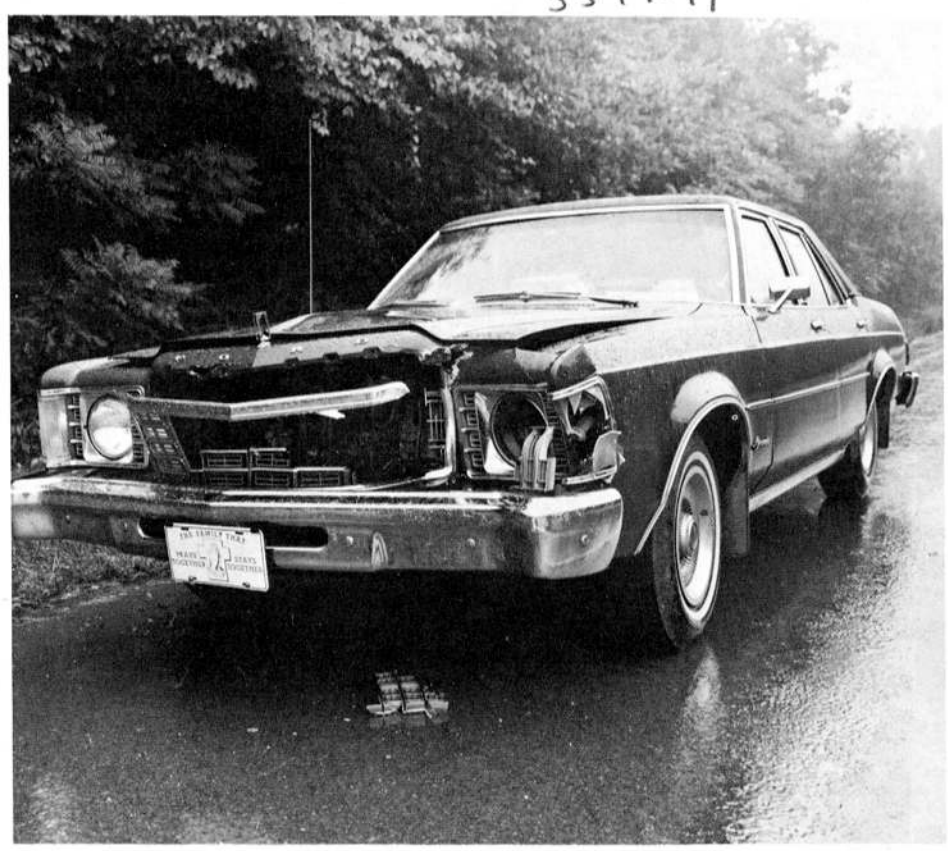
Ward, a native of Hamlet, N.C., joined Union Carbide earlier this year after his graduation from North Carolina State University at Raleigh.

He lives at 116 Vandalia Road, Oak Ridge.



Elkins McKinstry

Richmond Ward



DEER/CAR COLLISION—This car (owner unknown) received extensive damage when it struck a 120-pound doe on Highway 95 recently. The accident brought to 20 the number of deer killed on the Oak Ridge reservation in 1977, more than doubling the number (nine) killed this time last year. Motorists are again cautioned to observe deer crossing signs and be alert for deer, especially from September to December when they are most active. Although only 32 deer were killed on the reservation during 1976, Environmental Sciences Division personnel believe that 60-70 will probably be killed before this year is over. So far, there has been no personal injury to occupants of the cars.

Secretarial courses to be presented

Special courses in preparation for the Certified Professional Secretary (CPS) Examination will begin September 13.

Under the sponsorship of the Oak Ridge Chapter of the National Secretaries Association (NSA), the following courses will be offered: *Economics and Management,* September 13 through October 13, Ernest E. Choat, instructor; *Accounting,* October 12 through January 4, Carl Butcher, instructor; *Environmental Relations,* January 5 through February 8, William S. Akers Jr., instructor; *Business Law,* February 9 through March 16, Dorothy Stuhlberg, instructor; *Secretarial Procedures and Administration,* March 13 through May 1, Virginia Hatch, instructor; *Data Processing,* April 3-10, Ray V. Thatcher, instructor; *Communications and Decision Making,* March 30 through April 20, Virginia Hatch, instructor.

All classes will be held at the Oak Ridge High School from 6:30 to 9:30 p.m., and are approved under the Carbide Educational Assistance Program for partial reimbursement upon satisfactory completion of the work.

Membership in NSA is not a prerequisite for taking the CPS Examination. The above-scheduled classes not only are preparation for CPS testing, but also provide valuable progress in a program of self-improvement for anyone in the secretarial field.

Registration forms may be obtained from Ellen Queener, CPS, ORGDP, extension 3-9568, or at her home, 482-2844.

wanted...

ORNL

RIDERS to join Knoxville Commuter-Van Pool from West Knoxville, I-40 Papermill Rd., exit area to any portal. R. L. Pearson, plant extension 3-1805, home phone 588-9949. 8:15-4:45 shift.

recreationotes

Softball leagues...

The Snakes and Streakers still stand tall in both softball leagues, with no losses.

League standings follow:

ATOMIC LEAGUE

TEAM	WON	LOST
Snakes	15	0
Over-The-Hill-Gang	12	1
Shifters	13	2
Apaches	12	2
Hawgs	12	3
War Hogs	12	4
Supersonics	9	4
Gashouse Gang	10	5
Bruins	10	7
ESD	7	7
The Electric Bananas	7	7
Thunderdogs	7	7
Junk Yard Dogs	7	8
Dugout Dummies	8	10
B.T. Express	6	8
Bad Nu's	6	9
Arties Army	5	8
Short Circuits	6	10
Nads	3	10
Bio-Rejects	2	10
Clinton Labs	2	12
The Black Sheep	1	14
Beta 4 Bunters	0	12
Red Light Gang***	0	15

***Dropped from League

CARBON LEAGUE

TEAM	WON	LOST
Streakers	15	0
FES-KIDS	15	1
Forty-Niners	13	2
Knockers	12	3
CSD	14	4
Crippled Turkeys	12	4
Health Physiques	11	5
Killer Bees	11	5
League Leaders	10	6
Prime Time Players	9	8
Euler's Spoilers	7	7
Stinton's Stompers	7	7
Master Batters	6	7
Fed #1	7	10
Foul Balls	6	9
Fed #2	6	11
Up-Towners	5	11
Bombers	5	12
Tom's Turkeys	3	13
Pits	3	13
Odds 'n Ends	3	15
The Cad Pack	2	12
Barrier Bombers***	0	17

***Dropped from League

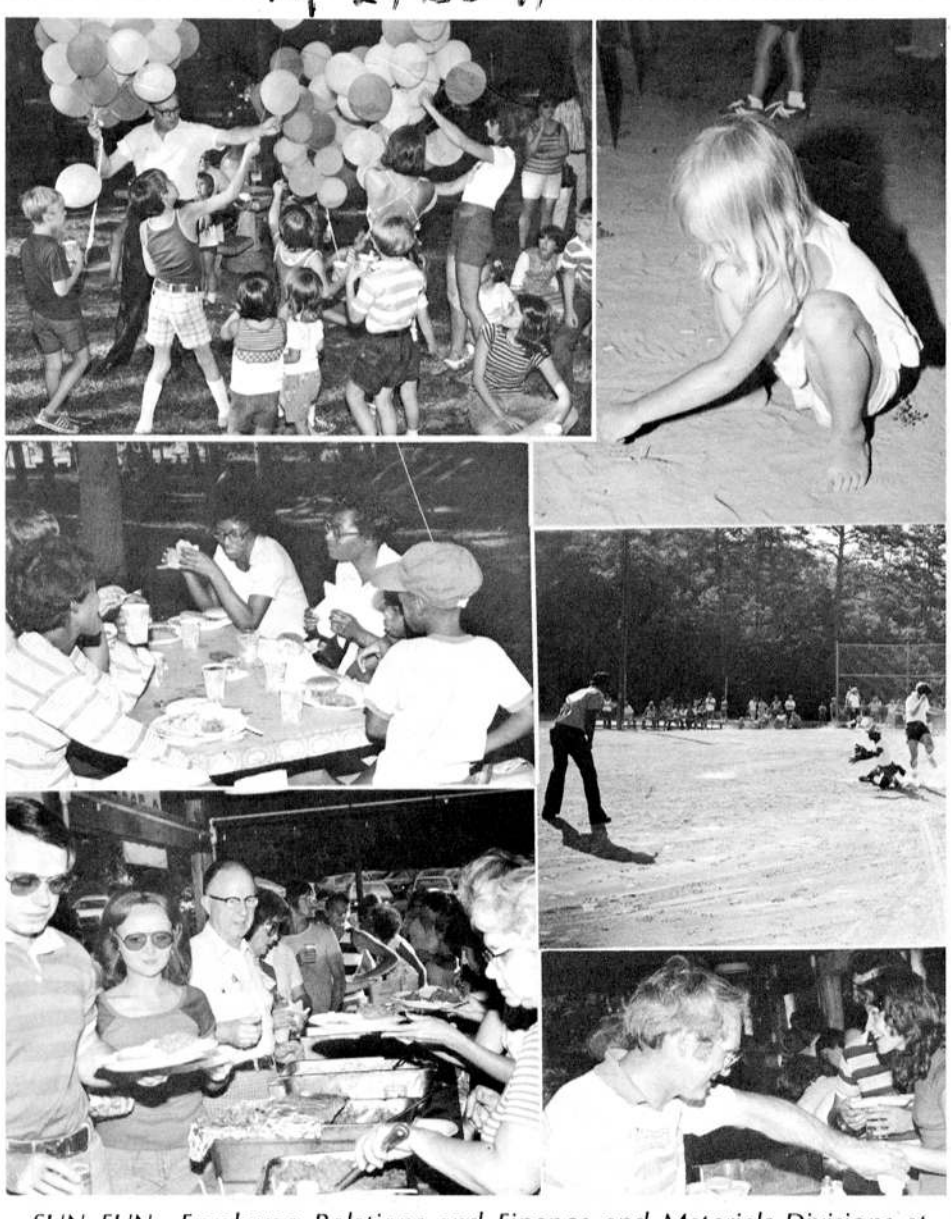
Warm weather energy-saver

If rooms are to be unoccupied for several hours, turn off the air-conditioning temporarily.

Y-12 department picnic

Y-12's Chemical Services Department is planning an annual picnic at Cove Lake State Park Saturday, September 3. Everyone is to bring a picnic supper and meet at 4 p.m. Dinner is at 5. It is hoped that all retired department employees will be there to enjoy the fun.

PH 2773-91



SUN FUN—Employee Relations and Finance and Materials Divisions at ORGDP combined forces recently for a day at the park. The softball competition was hot and heavy, and the ER crowd finally won. Everyone had their share of fun in the sun, especially the children.

JUNIOR FISHERMEN—Paducah fishermen took time out recently to honor their junior anglers. In the upper left is Butch Chestnutt, the sole winner in the 12-15 age bracket. At the top right are Debbie Mollenkamp and Leslie Travis, seated, and in the back row, from left, are Joe Pottinger, John Truitt and Garry Hall. In the lower picture are Alicia Richards, John Conrad and Jason Cassibry. The big event took place at Camp Energy in the Land Between the Lakes, the 170,000-acre public outdoor recreation area so popular in Western Kentucky.

Hi power rifle league . . .

Winners for the scratch division of the Carbide High Power Rifle League are Jack Huff, Y-12, with a 471 average from a possible 500. Bill Galyon, also of Y-12, placed second with 467. Larry Weston, ORNL, came in third with a 464. Corresponding winners in the handicap division were A. Abatiello, ORGDP, 480; Roger Wiegand, ORGDP, with a 479; and Don Kiplinger, ORNL, 478.

Women bowlers . . .

ORNL Ladies League will stage an organization meeting August 24, at 5 p.m. in the Ark Lanes. Ark will also provide two free games for anyone attending the meeting. Interested parties should contact Elizabeth Phipps, extension 3-5593, or Laura Walker, 3-5833, for more information. The league rolls every Wednesday at 5:45 and is set to begin September 7.

Physics gong show to highlight picnic

The annual ORNL Physics Division Picnic has been set for Saturday, August 20, at Clark Center Recreation Park. Games for all ages will begin at 1 p.m., and dinner will be served at 6:30 p.m., with entertainment featuring the "Gong Show" to follow.

Tickets can be obtained from Imogene Wilker, 3-0141, or Anita Barker, 3-1496.

Mixed bowling. . .

Individual bowlers and teams are needed for the Mixed League, which starts rolling August 31. They bowl on Wednesdays from the Tri-County Lanes at 5:50 p.m. If you want on a team, or want to enter your team, please call Bill Jago, extension 3-5445, or Bonnie Cooper, 3-3012.

Warm weather energy-saver

If you can confine your living spaces to fewer rooms, close off the rooms that will not be occupied.

New Fusion Energy development. . .

Princeton Large Torus neutral beam injection systems

Researchers in the Fusion Energy Division of ORNL have developed four neutral beam injection systems for the Princeton Large Torus (PLT), a fusion research device at the Princeton Plasma Physics Laboratory, Princeton, N.J.

The neutral beam systems represent another step toward the use of nuclear fusion as a virtually unlimited source of power, the researchers say.

Experiments this summer

The ORNL system will inject a total of three megawatts of power into the PLT plasma, raising its temperature from 10 million degrees to about 50 million degrees—much closer to the temperatures required for a working fusion power reactor. Scientists from Oak Ridge and Princeton will study the plasma and operating conditions of PLT to learn more about fusion.

Nuclear fusion, the process by which the sun produces light and heat, occurs when two nuclei of a light element are combined or fused to form the nucleus of a heavier element, a process which releases large amounts of energy. (Fusion may be thought of as the opposite of fission, in which a heavy nucleus is split apart into lighter nuclei.)

Fusion occurs only at extremely high temperatures, in the range of 60 million degrees on the Kelvin scale. At these high temperatures, matter can exist only in a gaseous state called a plasma.

In a fusion research device, the plasma must be held away from the walls of the device by magnetic fields to keep the plasma ions from striking the walls and losing energy. The plasma is heated with an electric current which brings its temperature to about 10 million degrees. Beams of neutral hydrogen particles are then injected into the plasma, transmitting their energy to the particles in the plasma and raising its temperature.

Neutral beam experiments with PLT will begin as soon as ORNL's first injection systems are installed this summer. All four neutral beam systems should be installed before the end of the year.

The high energy neutral beams produced by the ORNL injection systems are achieved with a compact system consisting of several components. An ion source accelerates hydrogen particles by stripping off their electrons and giving the particles an electrostatic charge. This produced the ion beam, a high-energy stream of hydrogen nuclei which are then neutralized as they pass through a cell containing molecular hydrogen gas.

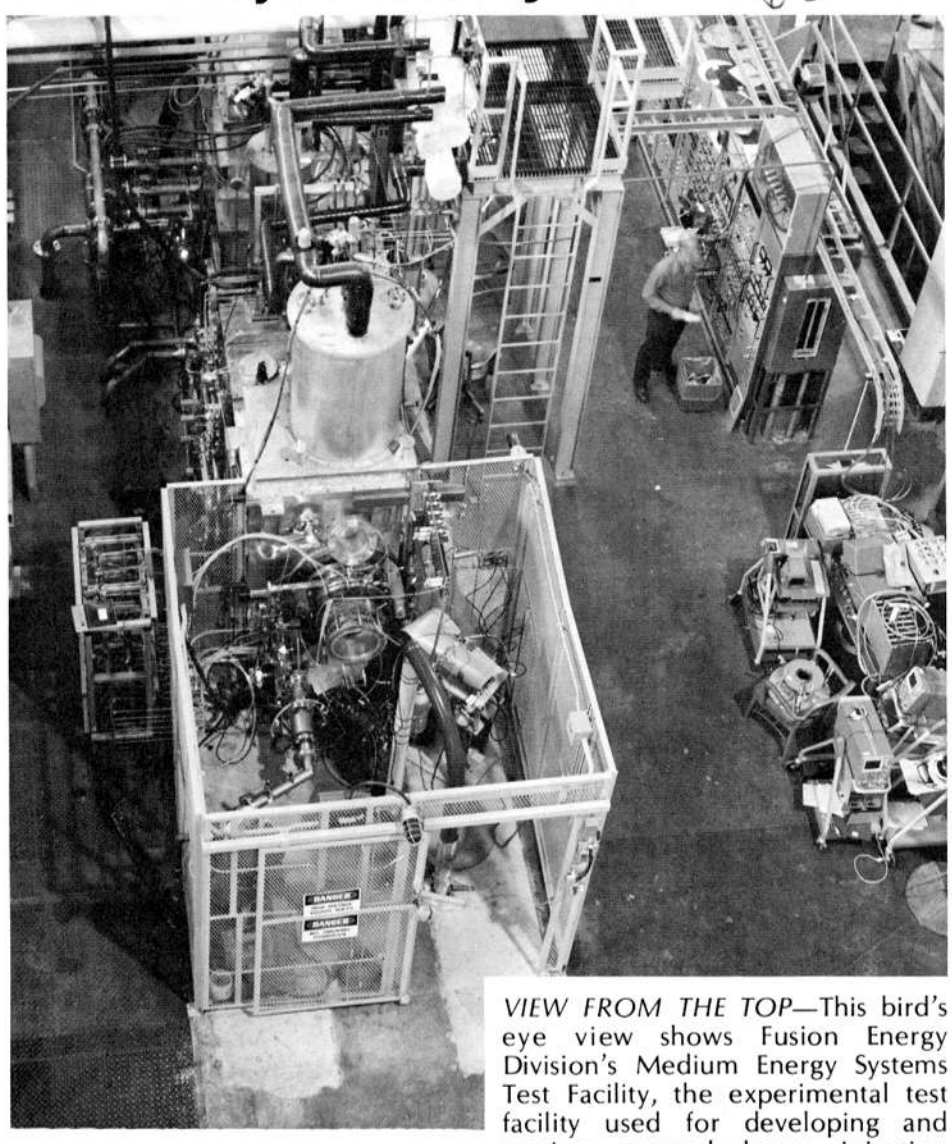
Based on ORMAK research

The beam is monitored and defined by calorimeters and beam-shaping devices, then transported to the PLT plasma through a pumping system operating at cryogenic temperatures—near absolute zero.

ORNL's development of neutral beam injection systems has been based on research work developed over the past several years for the Oak Ridge Tokamak (ORMAK), the ORNL fusion research device that completed operations in late 1976.

(Please see page 8)

630677



VIEW FROM THE TOP—This bird's eye view shows Fusion Energy Division's Medium Energy Systems Test Facility, the experimental test facility used for developing and testing neutral beam injection systems for the Princeton Large Torus. ORNL's development of the PLT injection systems was based on research work developed over the past several years for ORMAK.

New ORNL program for minority engineering students

The first five appointments under a new national program to encourage minority students to pursue graduate degrees in engineering have been announced at ORNL.

The students, from the National Consortium for Graduate Degrees in Engineering, Inc., began 12-week summer work-study assignments at ORNL in June. The Laboratory is one of eight research centers and 19 universities throughout the U. S. which joined together in late 1976 to form the consortium.

3119-77

NATIONAL CONSORTIUM STUDENTS—Three of the first consortium students selected to work at ORNL are; from left to right, Fred J. Silva, Syd K. Seymour and Jerome Jackson. Yvonne Lovely and G. Dan Robbins, Employee Relations Division, are program administrators. See photo insets for the other two consortium students.

Students working at ORNL this summer are Jerome Jackson, Ruben Moreno, and Richard P. Flores, Stanford University; Sydney K. (Syd) Seymour, North Carolina State University; and Fernando J. (Fred) Silva, Pennsylvania State University. Jackson and Seymour are assigned to the Chemical Technology Division, while Moreno, Silva and Flores are working in the Engineering Division.

The consortium recruits capable Black American, Mexican American, American Indian and Puerto Rican students from every accredited engineering school in the country.

After their junior year, applicants selected for the program begin work at one of the participating industry or government laboratories. Based on satisfactory work performance and successful application for admission to a graduate program in engineering, students may continue in the consortium's program for as many as three years.

3116-77

Moreno

3119-77

Flores

Graduate school costs are shared by the consortium and universities, and students are given a maximum of two years to complete work on the master's degree, after which participation in the program ends. Each student receives a $3,000 fellowship for the academic year, plus tuition.

The consortium's goal is to increase by 100 the number of minority students receiving the master's degree in engineering annually. It is a nonprofit corporation chartered in the state of Indiana, with headquarters at the University of Notre Dame. Representing ORNL on the board of directors is G. Daniel Robbins, head of the Office of Professional and University Relations in the Employee Relations Division. Coordinating the program at ORNL is Yvonne Lovely, also in the Employee Relations Division.

Tobacco/Smoke program

(Continued from page 1)

and the tobacco industry, the program monitors and provides assistance to other NCI contractors who perform inhalation studies to see that the testing is being done correctly.

This work has been greatly simplified by a light scattering device which was recently developed in collaboration with Tom Gayle of the Instrumentation and Controls Division. The device allows for continuous instrumental monitoring of exposure conditions.

Cooperative projects

Many studies have been carried out in cooperation with industrial laboratories to evaluate analytical methods. The team also has assisted the governments of several foreign countries in developing advertising policies by determining important chemicals such as nicotine, tar and carbon monoxide in commercial cigarettes. Most of these data have been generated by Brad Quincy and Amos Marshall.

Computerized data handling and other new methods developed in the smoke research program allow for simultaneous determination of up to 100 smoke constituents at a time. These methods are used to more fully characterize important cigarette types and to search for chemicals that are responsible for toxicity. Among the types that can be screened are organic chemicals in the gas phase of smoke, polynuclear aromatic carcinogens, and terpenes. The quantity of about 30 of the most toxic of these chemicals is now determined routinely.

Tobacco substitute

To date, approximately 150 experimental cigarettes have been designed by NCI and produced by the tobacco industry for study by the researchers. They are also studying a new type of material called Artificial Tobacco Substitute (ATS). This paper-like cellulose material resembles tobacco physically, but lacks its flavor and smell (although flavor may be introduced to make it taste like tobacco).

ATS produces less smoke than cigarettes made from tobacco, but there are conflicting reports as to whether it is a less hazardous smoke. Even if it turns out to be a safer cigarette, there is no assurance that smokers will accept it as a substitute for tobacco.

"Just as tar and nicotine were reduced in cigarettes, the content of hazardous gases will also be reduced," says Guerin. "Most low-tar commerical cigarettes already yield lower quantities of gases than the higher tar brands."

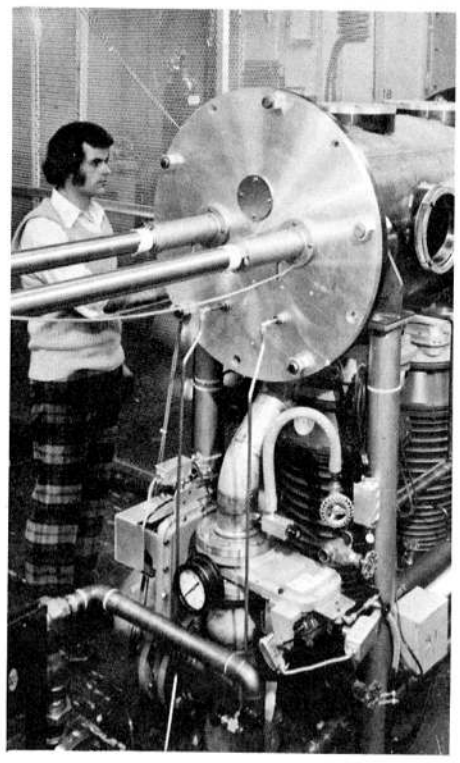
Scientists at ORNL will continue to aid in this overall effort to produce a less-hazardous cigarette.

New Fusion Energy Division development

(Continued from page 7)

Neutral beam heating used on ORMAK produced ion temperatures ranging from 6 to 18 million degrees.

The fusion energy program at ORNL is under the direction of John F. Clarke; the PLT injection project is headed by Hal Haselton of the Fusion Energy Division's Plasma Heating and Fueling Department. Other Division researchers working on the PLT project are Will Stirling and C. C. Tsai. Engineering support was provided by Ray L. Johnson, Marvin Baer and Phil Whitfield of the Nuclear Division's Engineering staff.



PROJECT HEAD—Hal Haselton is shown working with a forerunner of the PLT injection systems. Haselton, of Fusion Energy's Plasma Heating and Fueling Department, is head of the PLT injection project.

Medicine chest

(Continued from page 2)

outside temperature at 95 degrees and the relative humidity at 75 percent will experience considerable stress, but for less than an hour. The man who pushes a lawn mower for two to three hours or plays tennis under the same conditions will experience heat stress.

Most people can take care of their summertime salt needs by using a little more salt on their food or eating more salty foods. Those who stay in air conditioned buildings or get little outdoor exercise don't need any extra. Patients who have high blood pressure and are on medication should be especially careful about exposure to prolonged heat stress and should not add extra salt to their diet without special instructions from their physician. Being physically fit is essential before attempting any prolonged exercise during hot humid weather.

There has been much discussion about the advantages of sweetened electrolyte solutions such as Gatorade. If a person is exposed to prolonged heat stress, these solutions are useful, if you like the taste of them, but expensive and certainly not necessary. If one had to drink six to eight quarts a day, it could get a bit tiresome. One liter contains a little over one gram of salt.

safe thinking . . .

IMPROVISED BACK BRACE — A flat door can be used as a back board to keep the spine aligned after a driving accident. The injured person should be carefully strapped onto the door so that his spine and neck cannot move.

BEANBAG ASHTRAYS — Make excellent coin holders for the driver who must pass through several toll gates. This eliminates fumbling through pockets looking for coins and risking loss of control of the car.

Editor's Note — Don't be selfish with your safety tips! Call the **Nuclear Division News** *Office, and tell us your stories or hints on safety.*

Best paper award at RST meeting

Three ORNL employees pooled their efforts in a paper that received the best paper award from those presented at this year's Remote Systems Technology (RST) Conference in Washington, D.C. The formal announcement will be made in November at the 25th annual conference in San Francisco.

John E. Bigelow and Joe B. Knauer Jr., both of the Operations Division; and Leonard C. (Red) Williams, Metals and Ceramics Division; received certificates of merit from the RST Division of the American Nuclear Society for their paper entitled "Equipment and Techniques for Remote Fabrication and Calibration of Physically Small High-Intensity 252 Cf Neutron Sources."

3206-77

NEWEST WISE OWL—At right, Carl H. Overton, machinist in ORNL's Fabrication Department, is the 31st person in the Plant and Equipment (P&E) Division to receive membership in the Wise Owl Club. He receives his membership certificate from Harry E. Seagren, P&E division director, left.

UNION CARBIDE
UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

ADDRESS CORRECTION REQUESTED

BULK RATE
U.S. Postage
PAID
Union Carbide Corporation